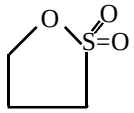
1,3-PROPANE SULTONE

1,3-Propane sultone is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 1120-71-4



Molecular Formula: $C_3H_6O_3S$

1,3-Propane sultone occurs as a colorless liquid or as white crystals. It is soluble in water (100 grams per liter) and in many organic solvents such as esters, ketones, and aromatic hydrocarbons. It is insoluble in aliphatic hydrocarbons. When heated to decomposition, 1,3-propane sultone emits toxic fumes of sulfur oxides (NTP, 1994a).

Physical Properties of 1,3-Propane Sultone

Synonyms: propane sultone; 3-hydroxy-1-propanesulphonic acid sultone; 1,2-oxathiolane, 2,2-dioxide

Molecular Weight:	122.1
Boiling Point:	180 °C at 30 mm Hg
Melting Point:	31 °C
Density/Specific Gravity:	1.393 at 40/4 °C (water = 1)
Water Solubility	100 g/liter
Conversion Factor:	1 ppm = 5.0 mg/m^3

(HSDB, 1991; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

1,3-Propane sultone is used as a chemical intermediate in detergents, lathering agents, and bacteriostats, and as a corrosion inhibitor for untempered steel (NTP, 1994a). The primary stationary sources that have reported emissions of 1,3-propane sultone in California are manufacturers of search and navigation equipment (ARB, 1997b).

B. Emissions

The total emissions of 1,3-propane sultone from stationary sources in California are estimated to be at least one pound per year, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

1,3-Propane sultone does not naturally occur in the environment (NTP, 1994a).

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of 1,3-propane sultone.

INDOOR SOURCES AND CONCENTRATIONS

No information about indoor sources and concentrations of 1,3-propane sultone was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

No information about atmospheric persistence of 1,3-propane sultone was found in the readily-available literature.

AB 2588 RISK ASSESSMENT INFORMATION

The Office of Environmental Health Hazard Assessment reviews risk assessments submitted under the Air Toxics "Hot Spots" Program (AB 2588). Of the risk assessments reviewed as of December 1996, 1,3-propane sultone was not listed in any of the risk assessments (OEHHA, 1996b).

HEALTH EFFECTS

Probable routes of human exposure to 1,3-propane sultone are inhalation and ingestion (NTP, 1994a).

Non-Cancer: No information is available on human non-cancer health effects caused by 1,3-propane sultone (U.S. EPA, 1994a). The United States Environmental Protection Agency (U.S. EPA) has not established an oral Reference Dose (RfD) for 1,3-propane sultone, and the Reference Concentration (RfC) is under review (U.S. EPA, 1994a).

No information is available on adverse reproductive or developmental effects of 1,3-propane sultone in humans. Adverse reproductive effects including malignant neurogenic tumors and tumors of the pancreas and ovary were seen in the offspring of pregnant rats who were given a single intravenous injection of 1,3-propane sultone during gestation (U.S. EPA, 1994a).

Cancer: No information is available on the carcinogenic effects of 1,3-propane sultone in humans. Tumors of the brain and other central nervous system tissues have been seen in rodents that were orally and intravenously exposed to 1,3-propane sultone. The U.S. EPA has classified

1,3 propane sultone in Group B2: Probable human carcinogen (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified 1,3-propane sultone in Group 2B: Possible human carcinogen (IARC, 1987a).

The State of California has determined under Proposition 65 that 1,3-propane sultone is a carcinogen (CCR, 1996). The inhalation potency factor that has been used as a basis for regulatory action in California is 6.9×10^{-4} (microgram per cubic meter)$^{-1}$ (OEHHA, 1994). In other words, the potential excess cancer risk for a person exposed over a lifetime to 1 microgram per cubic meter of 1,3-propane sultone is estimated to be no greater than 690 in 1 million. The oral potency factor that has been used as a basis for regulatory action in California is 2.4 (milligram per kilogram per day)$^{-1}$ (OEHHA, 1994).